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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): Y. Tahara et al.
Docket No.: JP919990202
Serial No.: 09/656,964
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Group: 2655
Examiner: Michael N. Opsasnick

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: V. Benicewicz Date: November 26, 2003

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Technology Center 2600

Title: Methods and Apparatus for Recognized Word
Registration in Accordance With Speech
Recognition

SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants (hereinafter referred to as "Appellants") hereby appeal the rejection of claims 1-3, 5-7 and 9-11 of the above-identified application.

REAL PARTY IN INTEREST

The present application is assigned to International Business Machines Corporation, as evidenced by an assignment recorded December 4, 2000 in the U.S. Patent and Trademark Office at Reel 011310, Frame 0622. The assignee, International Business Machines Corporation, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals and interferences.

STATUS OF CLAIMS

Claims 1-3, 5-7 and 9-11 stand rejected under 35 U.S.C. §103(a). Claims 1-3, 5-7 and 9-11 are appealed. Claims 4, 8 and 12 have been allowed.

STATUS OF AMENDMENTS

There has been no amendment filed subsequent to the final rejection. However, a Response to Final Office Action was filed on February 27, 2003, and an Appeal Brief was filed on June 5, 2003.

SUMMARY OF INVENTION

The present invention provides techniques that maintain speech recognition accuracy when a new word is being registered in a speech recognition dictionary (Specification, page 3, lines 1-3).

In one aspect of the invention, a technique for performing recognized word registration may comprise the following steps/operations. First, a word inscription specified by a user is obtained. A word dictionary is searched to obtain a sounds-like spelling corresponding to the word inscription. A pronunciation dictionary is searched to obtain a base form corresponding to the sounds-like spelling that has been obtained. Then, the base form is registered in a speech recognition dictionary (Specification, page 3, line 23, through page 4, line 3).

In another aspect of the invention, techniques for performing recognized word registration may comprise the following steps/operations. First, a word inscription is specified by a user. A word dictionary is searched to obtain a plurality of sounds-like spellings that correspond to said word inscription and sounds-like spelling scores that correspond to the sounds-like spellings. The plurality of sounds-like spellings are displayed for the user. The sounds-like spelling that is selected by the user is obtained from among the plurality of sounds-like spellings. Then, a pronunciation dictionary is searched to obtain a base form and a pronunciation score corresponding to the sounds-like spelling that has been obtained. A determination is made as to whether the pronunciation score exceeds a predetermined threshold value. The base form is then registered in a speech recognition dictionary

when the pronunciation score exceeds the predetermined threshold value (Specification, page 4, lines 4-19).

In a further aspect of the invention, techniques for performing recognized word registration may comprise the following steps/operations. First, it is determined whether first voice information obtained for a user's voice matches a predetermined condition. A speech recognition wizard panel that includes a new word input field and a sounds-like spelling input field is displayed on a display screen, when the voice information matches said predetermined condition. A new word and a sounds-like spelling that are entered in the speech recognition wizard panel are obtained. Second voice information based on the user's pronunciation provided for the new word and the sounds-like spelling is obtained. The second voice information, the new word and the sounds-like spelling are employed to specifically describe a base form. Then, the base form is added to a speech recognition dictionary (Specification, page 4, line 20, through page 5, line 7).

Accordingly, by way of example, the following steps describe an illustrative embodiment of the present invention. A sounds-like spelling group is generated in which scores are used for word descriptions. A user selects a correct sounds-like spelling from a generated sounds-like spelling group, and a group of base forms is generated with scores provided for the selected sounds-like spelling and the reading of the word. In this fashion, a base form having a score that exceeds a reference value is registered without a voice recording being required. During the speech recognition process as performed by a user, when a predetermined error state is detected, e.g., when the number of recognition errors exceeds N, a panel is output requesting that the user register the inscription, the sounds-like spelling and the pronunciation inscription for the word and that the user record a corresponding pronunciation. In accordance with the pronunciation provided by the user, the base form is obtained and is re-registered in the speech recognition dictionary (Specification, page 3, lines 13-22).

FIGs. 1 and 2 conceptually depict recognized word registration processing techniques, according to an embodiment of the invention (Specification, page 13, lines 13-26). FIGs. 5 and 6 respectively depict a word dictionary and a pronunciation dictionary, according to embodiments of the invention (Specification, page 16, line 14, through page 17, line 5). An embodiment of a

recognized word registration methodology of the invention is shown in FIG. 7, with reference to user interfaces in FIGs. 8, 9 and 10 (Specification, page 17, line 11, through page 19, line 9). An embodiment of a speech recognition methodology of the invention is shown in FIG. 11, with reference to a user interface in FIG. 12 (Specification, page 19, line 11, through page 20, line 15).

ISSUE PRESENTED FOR REVIEW

Whether claims 1-3, 5-7 and 9-11 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 5,208,897 to Hutchins (hereinafter "Hutchins") in view of U.S. Patent No. 6,490,561 to Wilson et al. (hereinafter "Wilson") and an IBM Technical Disclosure Bulletin entitled "Using Alternate Spellings to Generate Baseforms" (hereinafter "IBM TDB").

GROUPING OF CLAIMS

Claims 1, 5 and 9 stand or fall together. Claims 2, 6 and 10 stand or fall together. Claims 3, 7 and 11 stand or fall together.

ARGUMENT

Appellants incorporate by reference herein the disclosure of all previous responses filed in the present application, namely: an Amendment and Response to Office Action dated September 18, 2002; a Response to Final Office Action dated February 27, 2003; and an Appeal Brief dated June 5, 2003.

With regard to the issue of whether claims 1-3, 5-7 and 9-11 are unpatentable under 35 U.S.C. §103(a) over Hutchins in view of Wilson and IBM TDB, the Office Action contends that the cited combination discloses all of the claim limitations recited in the subject claims. Appellants respectfully assert that the combination of Hutchins, Wilson and IBM TDB fails to establish a prima facie case of obviousness under 35 U.S.C. §103(a), as specified in M.P.E.P. §2143.

As set forth in M.P.E.P. §2143, three requirements must be met to establish a prima facie case of obviousness. First, there must be some suggestion or motivation to combine reference

teachings. Second, there must be a reasonable expectation of success. Third, the cited combination must teach or suggest all the claim limitations. While it is sufficient to show that a prima facie case of obviousness has not been established by showing that one of the requirements has not been met, Appellants respectfully believe that none of the requirements have been met.

First, there is a clear lack of motivation to combine the references. For at least this reason, a prima facie case of obviousness has not been established. Hutchins and Wilson are directed to the performance of speech recognition, while IBM TDB is directed to building word models using sounds-like spellings for use in the performance of speech recognition. That is, the teachings in each reference are directed to completely different processes in speech recognition technology; two (Hutchins and Wilson) toward actual real-time recognition of a spoken utterance, the other (IBM TDB) toward building models that may eventually be used in actual real-time recognition of a spoken utterance. However, other than a very general and conclusory statement in the Office Action, there is nothing in the three references that reasonably suggests why one would actually combine the teachings of these three references.

The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination “must be based on objective evidence of record” and that “this precedent has been reinforced in myriad decisions, and cannot be dispensed with.” In re Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that “conclusory statements” by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved “on subjective belief and unknown authority.” Id. at 1343-1344.

In the Office Action at page 3, paragraph 3, the Examiner provides the following statement to prove motivation to combine Hutchins and Wilson, with emphasis supplied: “[t]herefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Hutchins (5208897) with a trained sound dictionary of words because it would advantageously allow for a higher recognition rate tailored for individual users.”

Additionally, in the Office Action at page 4, paragraph 1, the Examiner provides the following statement to prove motivation to combine Hutchins and IBM TDB, with emphasis

supplied: “[t]herefore, it would have been obvious to one of ordinary skill in the art of speech recognition to modify the teachings of Hutchins with a ‘sounds like spelling’ technique because it would advantageously allow user to enter the information more accurately than the phonetic pronunciations.”

Although the Examiner cites “IBM TDB, disclosure text, near the end,” after the above statement, Appellants submit that this statement is based on the type of “subjective belief and unknown authority” that the Federal Circuit has indicated provides insufficient support for an obviousness rejection. More specifically, the Examiner fails to identify any objective evidence of record which supports the proposed combination.

Second, Appellants assert that there is no reasonable expectation of success in achieving the present invention through a combination of Hutchins, Wilson and IBM TDB. For at least this reason, a prima facie case of obviousness has not been established. Despite the assertion in the Office Action, Appellants do not believe that Hutchins, Wilson and IBM TDB are combinable since it is not clear how one would combine them. There is no guidance provided in the present Office Action. However, even if combined, for the sake of argument, they would not achieve the automated registration techniques of the claimed invention.

Third, Appellants assert that even if combined, the combination fails to teach or suggest all of the limitations of the claims. For at least this reason, a prima facie case of obviousness has not been established.

Regarding independent claims 1, 5 and 9, the invention recites a method, apparatus and program code, respectively, for performing recognized word registration. First, a word inscription specified by a user is obtained. A word dictionary is searched to obtain a sounds-like spelling corresponding to the word inscription. A pronunciation dictionary is searched to obtain a base form corresponding to the sounds-like spelling that has been obtained. Then, the base form is registered in a speech recognition dictionary.

Hutchins is cited as teaching such steps with the exception of the concept of continued adding to a dictionary and use of sounds-like spellings, which is said to be taught by Wilson and IBM TDB, respectively. Appellants strongly disagree. As explained above, all of Hutchins’ operations have

to do with actually recognizing speech uttered by a user. The techniques of Hutchins have nothing to do with the registration of words in a speech recognition dictionary, as in the elements of claims 1, 5 and 9.

For example, in rejecting the first element of claims 1, 5 and 9, reciting the obtaining of a word inscription specified by a user, the Examiner simply directs the Appellants to FIG. 4a of Hutchins. FIG. 4a discloses audio input in a word recognition technique and fails to disclose a word inscription specified by a user in a word registration method.

In rejecting the second element of claims 1, 5 and 9, reciting the searching of a word dictionary to obtain a sounds-like spelling corresponding to said word inscription, the Examiner directs the Appellants to column 9, line 48 through column 11, line 42 of Hutchins. The Examiner has acknowledged that a word dictionary having sounds-like spellings are not disclosed in Hutchins, but contends that the remainder of this claim element is disclosed in these sections. However, these sections disclose evaluations of subsyllables and syllables from incoming speech against a predetermined database of subsyllable and syllable spellings. Therefore, Hutchins also fails to disclose the searching of a word dictionary to obtain a spelling corresponding to a word inscription input by a user in a word registration method.

In rejecting the third element of claims 1, 5 and 9, reciting the searching of a pronunciation dictionary to obtain a base form corresponding to the sounds-like spelling that has been obtained, the Examiner directs the Appellants to a portion of Hutchins that discloses phonetic detection in a digitizer of audio input. It is not clear how this relates to the searching of a dictionary to obtain a base form of a word based on a sounds-like spelling. Therefore, Hutchins also fails to disclose this element.

Finally, in rejecting the fourth element of claims 1, 5 and 9, reciting the registering of the base form in a speech recognition dictionary, the Examiner again directs the Appellants to the section of Hutchins relating to evaluations of subsyllables and syllables. However, Hutchins fails to disclose registering a base form of a word in a speech recognition dictionary in a word recognition method.

The Examiner acknowledges that Hutchins teaches away from adding to a dictionary since Hutchins has nothing to do with a word registration process and only mentions ways of improving

search time associated with a subsyllable dictionary when performing speech recognition. However, the Examiner cites Wilson in an attempt to incorporate continued adding to a dictionary. Wilson discloses a speech recognition method wherein spoken sounds are recognized and transcribed via a trained sound dictionary. However, Wilson fails as a reference in the same manner that Hutchins does, most notably in that Wilson discloses a speech recognition technique and not a word registration method. The disclosure of the trained sound dictionary in Wilson simply includes the speaking of a set of words with desired sounds embedded therein. Therefore, Wilson adds nothing to the deficiencies discussed above relating to Hutchins, and fails to disclose each of the same elements when combined with Hutchins.

While IBM TDB may make mention of the use of sounds-like spellings in building word models for use by a speech recognition system, the Examiner's attention is directed toward lines 12-13 of IBM TDB where it is stated that the technique described therein "proposes that sounds-like spellings be given by the user when it is wished to provide better data to the spelling-to-sound rules." Such rules may be used to add a word to the vocabulary of the speech recognition system.

Thus, IBM TDB teaches that the user actually inputs sounds-like spellings during the model building process. The claimed invention, as explained in the background and summary sections of the present specification, can overcome such a disadvantage. That is, as recited in claims 1, 5 and 9, after obtaining a word inscription specified by a user, the invention searches a word dictionary to obtain a sounds-like spelling corresponding to the word inscription. Thus, the user need not enter the sounds-like spelling since a word dictionary is searched to obtain a sounds-like spelling corresponding to said word inscription. A pronunciation dictionary is then searched to obtain a base form corresponding to the sounds-like spelling that has been obtained. Then, the base form is registered in a speech recognition dictionary. This is accomplished, for example as pointed out at page 13, line 21, of the present specification, "without a voice having to be recorded." This is not what is disclosed by the IBM TDB technique, and certainly not by any combination of IBM TDB with Hutchins.

Appellants do not assert that they have developed the concept of "sounds-like spellings." Such spellings are known, for example, as evidenced by IBM TDB. However, the automated use

of “sounds-like spellings” as recited in the registration techniques of the claimed invention was not known prior to the invention and is clearly not taught or suggested by the combination of Hutchins, Wilson and IBM TDB.

Thus, for at least the above reasons, Appellants request withdrawal of the §103(a) rejection of claims 1, 5 and 9.

Similar arguments apply to independent claims 2, 6 and 10, which also recite a method, apparatus and program code, respectively, for performing recognized word registration. In accordance with the claimed invention, a word inscription is specified by a user. A word dictionary is searched to obtain a plurality of sounds-like spellings that correspond to said word inscription and sounds-like spelling scores that correspond to the sounds-like spellings. The plurality of sounds-like spellings are displayed for the user. The sounds-like spelling that is selected by the user is obtained from among the plurality of sounds-like spellings. Then, a pronunciation dictionary is searched to obtain a base form and a pronunciation score corresponding to the sounds-like spelling that has been obtained. A determination is made as to whether the pronunciation score exceeds a predetermined threshold value. The base form is then registered in a speech recognition dictionary when the pronunciation score exceeds the predetermined threshold value.

Again, Hutchins and Wilson have nothing to do with word registration and IBM TDB, for the same reasons as pointed out above, does not teach searching a word dictionary to obtain a plurality of sounds-like spellings that correspond to the word inscription and sounds-like spelling scores that correspond to the sounds-like spellings; displaying the plurality of sounds-like spellings for the user; obtaining the sounds-like spelling that is selected by the user from among the plurality of sounds-like spellings; searching a pronunciation dictionary to obtain a base form and a pronunciation score corresponding to the sounds-like spelling that has been obtained; determining whether the pronunciation score exceeds a predetermined threshold value; and registering the base form in a speech recognition dictionary when the pronunciation score exceeds the predetermined threshold value. The Office Action seems to point to IBM TDB for disclosing sounds-like spelling scores, and displaying sounds-like spellings to the user; however, Appellants find no such teachings in the reference. Also, since Hutchins has nothing to do with a word registration process, nothing

therein teaches or suggests the elements of claims 2, 6 and 10. IBM TDB fails to remedy these deficiencies.

Thus, for at least the above reasons, Appellants request withdrawal of the §103(a) rejection of claims 2, 6 and 10.

Lastly, similar arguments apply to independent claims 3, 7 and 11, which also recite a method, apparatus and program code, respectively, for performing recognized word registration. The claimed invention determines whether first voice information obtained for a user's voice matches a predetermined condition. A speech recognition wizard panel that includes a new word input field and a sounds-like spelling input field is displayed on a display screen, when the voice information matches said predetermined condition. A new word and a sounds-like spelling that are entered in the speech recognition wizard panel are obtained. Second voice information based on the user's pronunciation provided for the new word and the sounds-like spelling is obtained. The second voice information, the new word and the sounds-like spelling are employed to specifically describe a base form. Then, the base form is added to a speech recognition dictionary.

Hutchins, Wilson and IBM TDB fail to teach or suggest such a word registration technique that uses a speech recognition wizard panel, and such first and second voice information from the user. The Office Action seems to point to Hutchins for disclosing such a wizard panel and use of such user voice information; however, Hutchins has nothing to do with a word registration process. Also, no such details are disclosed in IBM TDB.

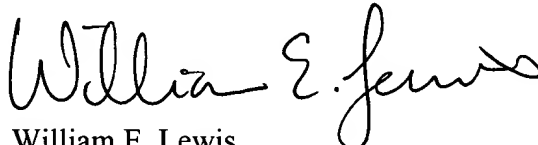
Thus, for at least the above reasons, Appellants request withdrawal of the §103(a) rejection of claims 3, 7 and 11.

Regarding the "Response to Arguments" section in the Office Action and the motivation to combine Hutchins and IBM TDB, the Examiner points to IBM TDB teaching the concept of replacing phonetic input with sounds-like spelling input. However, since Hutchins has nothing to do with word registration, it is unclear why this would provide any motivation to combine Hutchins with IBM TDB. Further, as discussed above the present invention does not provide sounds-like spellings as the user input for the word registration system.

Appellants point out that while their arguments may, at times, discuss Hutchins, Wilson and IBM TDB one at a time, it is in an effort to clearly illustrate that the references do not teach or suggest one or more of the elements of the claimed invention. Thus, in general, by pointing out that reference 1 fails to disclose an element, say element A, and then pointing out that references 2 and 3 also fails to disclose element A, the discussion effectively points out that the combination of the three references, even if proper, would fail to disclose element A.

For at least the reasons given above, Appellants respectfully request withdrawal of the §103(a) rejections of claims 1-3, 5-7 and 9-11. Appellants believe that claims 1-3, 5-7 and 9-11 are not obvious in view of Hutchins, Wilson and IBM TDB. As such, the application is asserted to be in condition for allowance, and favorable action is respectfully solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "William E. Lewis". The signature is fluid and cursive, with the first name "William" being the most prominent part.

Date: November 26, 2003

William E. Lewis
Attorney for Applicant(s)
Reg. No. 39,274
Ryan, Mason & Lewis, LLP
90 Forest Avenue
Locust Valley, NY 11560
(516) 759-2946

APPENDIX

1. A recognized word registration method, for a speech recognition apparatus that includes a display screen and a voice input device, comprising the steps of:

- obtaining a word inscription specified by a user;
- searching a word dictionary to obtain a sounds-like spelling corresponding to said word inscription;
- searching a pronunciation dictionary to obtain a base form corresponding to said sounds-like spelling that has been obtained; and
- registering said base form in a speech recognition dictionary.

2. A recognized word registration method, for a speech recognition apparatus that includes a display screen and a voice input device, comprising the steps of:

- obtaining a word inscription specified by a user;
- searching a word dictionary to obtain a plurality of sounds-like spellings that correspond to said word inscription and sounds-like spelling scores that correspond to said sounds-like spellings;
- displaying said plurality of sounds-like spellings for said user;
- obtaining said sounds-like spelling that is selected by said user from among said plurality of sounds-like spellings;
- searching a pronunciation dictionary to obtain a base form and a pronunciation score corresponding to said sounds-like spelling that has been obtained;
- determining whether said pronunciation score exceeds a predetermined threshold value; and
- registering said base form in a speech recognition dictionary when said pronunciation score exceeds said predetermined threshold value.

3. A recognized word registration method, for a speech recognition apparatus that includes a display screen and a voice input device, comprising the steps of:

- determining whether first voice information obtained for a user's voice matches a predetermined condition;

displaying on said display screen, when said voice information matches said predetermined condition, a speech recognition wizard panel that includes a new word input field and a sounds-like spelling input field;

obtaining a new word and a sounds-like spelling that are entered in said speech recognition wizard panel;

obtaining second voice information based on said user's pronunciation provided for said new word and said sounds-like spelling;

employing said second voice information, said new word and said sounds-like spelling to specifically describe a base form; and

adding said base form to a speech recognition dictionary.

5. A speech recognition apparatus, which includes a display screen and a voice input device, comprising:

a recognized word registration unit for obtaining a word inscription specified by a user;

a sounds-like spelling generator for searching a word dictionary to obtain a sounds-like spelling corresponding to said word inscription;

a base form generator for searching a pronunciation dictionary to obtain a base form corresponding to said sounds-like spelling that has been obtained; and

a speech recognition dictionary in which said base form is registered.

6. A speech recognition apparatus, which includes a display screen and a voice input device, comprising:

a recognized word registration unit for obtaining a word inscription specified by a user;

a sounds-like spelling generator for searching a word dictionary to obtain a plurality of sounds-like spellings that correspond to said word inscription and sounds-like spelling scores that correspond to said sounds-like spellings, and for obtaining said sounds-like spelling that is selected by said user from among said plurality of sounds-like spellings on said display screen;

a base form generator for searching a pronunciation dictionary to obtain a base form and a pronunciation score corresponding to said sounds-like spelling that has been obtained; and

a speech recognition dictionary in which said base form is registered when said pronunciation score exceeds a predetermined threshold value.

7. A speech recognition apparatus, which includes a display screen and a voice input device, comprising:

a recognized word registration unit for determining whether first voice information obtained for a user's voice matches a predetermined condition;

a speech recognition wizard for displaying on said display screen, when said voice information matches said predetermined condition, a speech recognition wizard panel that includes a new word input field and a sounds-like spelling input field;

a voice input unit for obtaining second voice information based on said user's pronunciation provided for a new word and a sounds-like spelling that are entered in said speech recognition wizard panel;

a base form generator for employing said second voice information, said new word and said sounds-like spelling to specifically describe a base form; and

a speech recognition dictionary to which said base form is added.

9. A storage medium on which is stored a recognized word registration program that is to be executed by a speech recognition apparatus that includes a display screen and a voice input device, said recognized word registration program comprising:

program code for instructing said speech recognition apparatus to obtain a word inscription specified by a user;

program code for instructing said speech recognition apparatus to search a word dictionary to obtain a sounds-like spelling corresponding to said word inscription;

program code for instructing said speech recognition apparatus to search a pronunciation dictionary to obtain a base form corresponding to said sounds-like spelling that has been obtained; and

program code for instructing said speech recognition apparatus to register said base form in a speech recognition dictionary.

10. A storage medium on which is stored a recognized word registration program that is to be executed by a speech recognition apparatus that includes a display screen and a voice input device, said recognized word registration program comprising:

program code for instructing said speech recognition apparatus to obtain a word inscription specified by a user;

program code for instructing said speech recognition apparatus to search a word dictionary to obtain a plurality of sounds-like spellings that correspond to said word inscription and sounds-like spelling scores that correspond to said sounds-like spellings;

program code for instructing said speech recognition apparatus to display said plurality of sounds-like spellings for said user;

program code for instructing said speech recognition apparatus to obtain said sounds-like spelling that is selected by said user from among said plurality of sounds-like spellings;

program code for instructing said speech recognition apparatus to search a pronunciation dictionary to obtain a base form and a pronunciation score corresponding to said sounds-like spelling that has been obtained;

program code for instructing said speech recognition apparatus to determine whether said pronunciation score exceeds a predetermined threshold value; and

program code for instructing said speech recognition apparatus to register said base form in a speech recognition dictionary when said pronunciation score exceeds said predetermined threshold value.

11. A storage medium on which is stored a speech recognition process program that is to be executed by a speech recognition apparatus that includes a display screen and a voice input device, said speech recognition process program comprising:

program code for instructing said speech recognition apparatus to determine whether first voice information obtained for a user's voice matches a predetermined condition;

program code for instructing said speech recognition apparatus to display on said display screen, when said voice information matches said predetermined condition, a speech recognition wizard panel that includes a new word input field and a sounds-like spelling input field;

program code for instructing said speech recognition apparatus to obtain a new word and a sounds-like spelling that are entered in said speech recognition wizard panel;

program code for instructing said speech recognition apparatus to obtain second voice information based on said user's pronunciation provided for said new word and said sounds-like spelling;

program code for instructing said speech recognition apparatus to employ said second voice information, said new word and said sounds-like spelling to specifically describe a base form; and

program code for instructing said speech recognition apparatus to add said base form to a speech recognition dictionary.